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10/587,656	07/28/2006	Toshimasa Kumaki	65341.00011	2833

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EXAMINER	
ROE, JESSEE RANDALL	

ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Continuation Sheet

Continuation of 5. Applicant's reply has overcome the following rejection(s): The previous rejection of claims 2, 8 and 16-19 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention is withdrawn in view of the Applicant's amendment to claim 2.

Continuation of 11. The request for reconsideration has been considered but does NOT place the application in condition for allowance because:

Applicant's arguments filed 17 July 2009 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that Kaufman ('077) describes that copper is applied to the unalloyed condition surrounding each particle of the powder and therefore Kaufman ('077) fails to describe or suggest, at least, "a coating disposed on an outer surface of a surface layer portion of the layered Fe-based alloy, the coating comprising a carbide formed by carbonizing a first element that comprises a property to increase a hardness of the layered Fe-based alloy," as recited in claim 2 and similarly recited in claim 11.

In response, the Examiner notes that Kaufman ('077) discloses that copper is applied in the unalloyed condition not to the unalloyed condition as argued by the Applicant (col. 4, lines 39-45). Additionally, the Examiner notes that Kaufman ('077) discloses that the outer peripheral region of each iron base powder particle will become

enriched with carbon and alloying ingredients (which would include hardeners such as molybdenum and chromium) which would include the iron-base (alloy) particles at the surface (col. 7, lines 38-43 and col. 10, lines 37-47). Kaufman ('077) further discloses that each ironcarbon particle has an interior peripheral zone containing dissolved and diffused alloying ingredients and an outer exterior film rich in copper and alloying ingredients (col. 10, lines 53-68).

Second, the Applicant primarily argues that Kaufman ('077) fails to describe or suggest, at least, "heat-treating said Fe-based alloy with said powder applied thereto, so that said first element is diffused to said surface layer portion and said first element reacts with carbon existing in said surface layer portion of said Fe-based alloy to form said carbide. The Applicant further argues that copper is used to regulate the diffusion of carbon into the base iron particles and because Kaufman ('077) describes that the carbon diffuses into the base iron particles, it would not be proper to further conclude that the carbon "reacts with carbon existing in said surface layer portion of said Fe-based alloy to form said carbide" as in claim 11.

In response, the Examiner notes that Kaufman ('077) discloses sintering at a temperature in the range of 2060°F to 2080°F (1127°C to 1138°C), which is within the range of the heat treatment of the instant invention (page 37, lines 21-23 of the instant specification). The Examiner additionally notes that one of the goals in Kaufman ('077) is to prevent diffusion of carbon via the use of copper and other elements such as silver and platinum. "Certain metallic elements, particularly copper, is an effective barrier to carbon loss during heating to the sintering temperature and while in the solid state

condition" (Kaufman ('077) lines 26-29) and "Other carbon barrier agents can be employed in addition to copper, such as silver and platinum. Two primary characteristics must be exhibited by such barrier: (a) it must prevent diffusion of carbon therethrough," (Kaufman ('077) lines 64-67). Therefore, it would be proper to conclude that the carbon "reacts with carbon existing in said surface layer portion of said Fe-based alloy to form said carbide" as in claim 11.

Third, the Applicant primarily argues that the surface layer of Tahara et al. ('282) is limited to 70 μm because of the time required to obtain this thickness, i.e., it takes at least 70 hours to obtain a surface layer thickness of 70 μm. Thus, one of ordinary skill in the relevant art would have understood that Tahara et al. ('282) dos not contemplate surface layer thicknesses greater than 70 μm because it would not have been economical.

In response, the fact that a combination would not be made by businessmen for economic reasons does not mean that a person of ordinary skill in the art would not make the combination because of some technological incompatibility. MPEP 2145 VII. Thus, one having ordinary skill in the art knows that in order to increase the carburizing depth, one can modify time and/or temperature to achieve the desired carburizing depth.

Fourth, the Applicant primarily argues that one of ordinary skill in the relevant art would not have been motivated to modify Tahara et al. ('282) with the subject matter described in the ASM Handbook Volume 4 because modifying temperature under which the austenitic stainless steel described in Tahara et al. ('282) would be heated would

render Tahara et al. ('282) unsatisfactory for its intended purpose since Tahara et al. ('282) describes that austenitic stainless steel is carburized using a low carburizing temperature no greater than 680°C and the ASM Handbook Volume 4 describes that carburizing commonly occurs at 925°C. .

In response, the Examiner notes that the ASM Handbook discloses modifying time and/or temperature to achieve the desired carburizing layer thickness. Thus, even though ASM Handbook may teach that carburizing commonly occurs at 925°C, the ASM Handbook Volume 4 does not preclude using other times and temperatures for carburizing (pg. 314, col. 2 – pg. 315, col. 3).

Fourth, the Applicant primarily argues that the description of Tahara et al. ('282) fails to describe a coating that is disposed on the outer surface of a surface layer portion of the layered Fe-based alloy, whereby the coating includes a carbide formed by carbonizing a first element that includes a property to increase a hardness of the layered Fe-based alloy.

In response, the Examiner notes that that carbide such as $Cr_{23}C_6$ precipitates, wherein chromium would be the first element, on the surface of the hard layer (col. 6, lines 63-67) and the hard layer has a surface hardness (i.e. hard layer is a surface layer) which is formed into a carburized layer wherein the $Cr_{23}C_6$ is not in the hard layer (col. 7, lines 35-49 and col. 9, lines 1-15). Therefore, Tahara et al. ('282) alone, or alternatively in view of the ASM Handbook Volume 4 meets the claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571)272-5938. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Roy King/
Supervisory Patent Examiner, Art Unit 1793

/JR/